

### **REMARKS**

Claims 1-3 are pending in the present application, and the Examiner rejected Claims 1-3 in an Office Action dated December 15, 2004. The Applicants submit this reply in response to the Office Action. As set forth more fully below, reconsideration and withdrawal of the Examiner's rejections of the claims are respectfully requested.

#### **Amendments to the Specification**

The disclosure has been amended at page 5 to clarify the description and better define the wording in the amended claims as provided herein. These changes were previously supported in the disclosure and drawings as filed. More particularly, Figures 3, 6, and 7 support the amendment to the disclosure that the stop surface 20 is located beneath the upper edge of the top ring 3.

#### **The Claimed Invention**

Before turning to the cited prior art and the Examiner's rejections, it is useful to review some of the relevant features or elements of the invention and to mention what these features enable.

The invention relates to a replaceable insert for use in the shell of a standing or traveling ball valve used in a reciprocating downhole pump.

The objective driving the invention was to develop an insert characterized by good volumetric flow rate. Yet the insert also had to have adequate strength so as to withstand the pounding applied by the valve ball in use.

The commercial prior art inserts commonly in use usually were designed with a single bar or crosspiece which formed the ball stop. The single bar was used to minimize the blockage of the flow area, while maximizing the strength and durability of the stop.

Applicant has combined several features which, in the most preferred embodiment, involve:

- Seeking to optimally position the ball at the upper end of its travel by centering it with a semi-spherical stop formed by a plurality of

circumferentially spaced apart flanges having curved bottom surfaces – thereby helping to improve volumetric flow rate;

- Thinning the stop flanges upwardly and inwardly so that their cumulative cross-sectional area approximates the cross-sectional area of the typical single bar stop – thereby helping to maintain volumetric flow rate in spite of forming the stop using a plurality of flanges;
- Reinforcing the relatively fragile, thinned stop flanges by tying them together to a central elongate upright reinforcing member, to thereby provide a strong and durable stop means;
- Arranging for the reinforcing member to extend above the top ring of the insert, where there is space to accommodate its length; and
- Helically configuring the spaced ribs and thus the openings between the ribs and the flanges, to thereby induce swirling flow, which contributes to improving volumetric flow rate.

Applicants have defined, in amended independent Claim 1, one embodiment of an insert incorporating:

- a plurality of thinning flanges;
- the flanges being connected at their inner ends with an upwardly directed reinforcing member;
- the reinforcing member and flanges protruding above the top ring; and
- the flanges having curved bottom surfaces which combine with the reinforcing member to form a semi-spherical stop located beneath the upper edge of the top ring.

Applicants have further recited in newly filed independent Claim 4 another embodiment incorporating:

- inclined ribs forming helically configured side openings or 'windows';
- the ribs supporting helically directed flanges having curved bottom surfaces;
- the flanges being connected at their inner ends with an upwardly directed reinforcing member; and

- the bottom surfaces of the flanges and the base of the reinforcing member combining to form a semi-spherical stop located beneath the upper edge of the top ring.

#### The Cited Prior Art

The Examiner has relied on three prior art references. Applicants now propose to summarize the relevant teachings of each reference and to summarize what each reference fails to teach. Applicants will then address the combinations of references and what each combination, taken as a whole, fairly teaches or suggests.

#### Hahn – U.S. Patent 735,248 – Issued 1903

This patent teaches a pump-piston comprising:

- a tubular cylindrical cage which is secured at its upper end to a rod 17, for reciprocation thereof;
- the cage has circumferentially spaced apart standards (or ribs) 2 which are vertically oriented and combine with top and bottom rings 12a, to define flow openings or windows 2' ;
- the cage further has inwardly and upwardly extending arms (or flanges) 13 which terminate to form stops d' below the top ring 12 and extend above the ring;
- the arms 13 connect with a central head 14; and
- a ball or valve C is positioned within the cage chamber and can rise, on downward travel of the assembly, to be stopped by point contact with the stops d'.

It is to be noted that the Hahn reference fails to teach any of the following elements associated with applicants' claimed subject matter:

- an insert for use within a valve shell; or
- flanges that arch inwardly and have curved bottom surfaces that combine with a reinforcing member to form a semi-spherical ball stop; or

- ribs which are inclined and shaped to form helically configured side openings;  
or
- helically directed flanges; or
- flanges thinning upwardly and inwardly.

Spears – U.S. Patent 6,283,148 – Issued 2001

This patent teaches a standing or traveling valve for a reciprocating downhole pump comprising:

- a body (or cage) having integral, internal, helically inclined fins (or flanges) 32 or 80, which have curved bottom surfaces;
- the body is only open at top and bottom – there are no side openings;
- the fins function to induce helical flow of fluid moving through the body bore;
- the curved bottom surfaces form a semi-spherical ball stop.

However, it is to be noted that the patent fails to teach any of the following elements associated with applicants' claimed subject matter:

- an insert for use within a valve shell; or
- the insert having circumferentially spaced apart ribs combining with top and bottom rings to form side openings; or
- a top ring; or
- a reinforcing member and flanges protruding above the upper ring; or
- the flanges and reinforcing member combining to form a semi-spherical ball stop; or
- the flanges thinning upwardly and inwardly; or
- the side openings being helically configured.

Nixon – U.S. Patent 1,555,068 – Issued 1925

This patent teaches a standing valve for a reciprocating downhole pump, comprising:

- a valve cage having inclined, circumferentially spaced apart ribs extending upwardly from a bottom ring, whereby the ring and ribs define helically configured side openings;

- a diametrical bar providing a stop for the ball at the top end of the cage; and
- flow passage –forming side openings inducing helical flow of the fluid passing through the cage.

However the Nixon reference fails to teach any of the following elements associated with applicants' claimed subject matter:

- an insert for use within a shell; or
- flanges supported by the ribs; or
- the flanges arching inwardly and having curved bottom surfaces; or
- an upwardly directed, central, elongate reinforcing member connected with the flanges at their upper ends; or
- the flanges and reinforcing member projecting above the insert top ring; or
- the curved bottom surfaces of the flanges and the reinforcing member combining to form a semi-spherical ball stop located beneath the upper edge of a top ring (which appears to be absent from the structure).

Claim Rejections under 35 U.S.C. §103(a) (Paragraph 2 of the Office Action):

The Examiner has rejected original Claim 1 under 35 U.S.C. §103(a) as being unpatentable over the primary reference, Hahn '248, in view of the secondary reference, Spears et al '148. To establish a prima facie case of obviousness under 35 U.S.C. §103(a), the Examiner must show that 1) the references teach all of the elements of the claimed invention, 2) the references contain some teaching, suggestion or motivation to combine the references, and 3) the references suggest a reasonable expectation of success. See MPEP §2142. See also In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); In re Kotzab, 217 F.3d 1365, 55 USPQ2d 1313 (Fed. Cir. 2000).

This rejection is respectfully traversed for the following reasons:

- neither Hahn nor Spears teach an insert for removable insertion in the shell of a ball and seat valve;

- Hahn provides flanges (arms) which are connected with a central upright head 14, but this head is provided to connect with the reciprocating rod 17, as required to create a reciprocating pump-piston (see column 1, lines 43-44);
- neither Hahn nor Spears teach flanges which thin inwardly; and
- neither Hahn nor Spears teach a semi-spherical ball stop, formed by the combination of the flanges and the reinforcing member, which are connected, with the ball stop being located beneath the upper edge of the top ring.

Applicants submit that this combination of references fails to teach or suggest the claimed combination comprising thinning a plurality of arched stop flanges (to gain volumetric throughput) and alleviating the resultant fragility of the stop means by tying the flanges to an elongate reinforcing member, in the context of an insert.

#### The Examiner's Assertions

The Examiner asserts:

(1) That Hahn discloses an insert. With respect, this is not correct. Hahn discloses a cage;

(2) That Spears teaches an insert. With respect, this is not correct. Spears teaches a valve body 20 (or cage); and

(3) That Spears teaches that the flanges thin upwardly and inwardly – Figures 19 and 6 of Spears appear to show otherwise.

The Applicants therefore respectfully submit that amended Claim 1 distinguishes the teachings of the combination of the Hahn and Spears references by reciting:

- an insert;
- the thinning of the flanges; and
- the connection of the thinned flanges with the central reinforcing member to collectively form a semi-spherical stop located beneath the upper edge of the top ring.

Claim Rejections under 35 U.S.C. §103(a) (Paragraph 3 of the Office Action):

The Examiner has rejected original Claims 2 – 3 under 35 U.S.C. §103(a) as being unpatentable over Hahn '248 in view of Spears et al '148 and Nixon '068. This rejection is respectfully traversed for the following reasons.

Applicants' claims are directed to an insert 1, that in use contains a valve ball 8, which insert is inserted and locked into the bore 21 of a tubular shell 2, together with a seat 7 and lock ring 9, to create an assembly that functions as an insert-type ball and seat valve for a reciprocating downhole pump.

The primary reference, Hahn, discloses a ball and seat valve being used as part of a piston pump. Hahn has been cited because it shows:

- top and bottom rings,
- circumferentially spaced apart ribs that form flow windows,
- flanges, supported by the ribs, which create a ball stop, and
- a central head which connects with the upper ends of the flanges.

However, one needs to ask some questions about the disclosed Hahn structure, more specifically:

- Can it be used in the shell of an insert-type ball and seat valve for a downhole pump?

With respect, it cannot. It is a structure that is designed so that the head 14 threads onto the pump rod 17 for reciprocation of the structure as part of a pump piston. Applicants' insert is stationary relative to the shell in which it is locked, when in use;

- Do the flanges have curved bottom surfaces that combine with the head to form a semi-spherical ball stop located beneath the upper edge of the top ring?

With respect, they do not.

Applicants respectfully submit that to convert the Hahn structure to an insert for an insert-type ball and seat valve would destroy it for its role as part of a reciprocating piston.



In conclusion then, it is respectfully submitted that the Hahn cage is not appropriate to use as the primary structure to be modified.

Claim 2 is dependent on Claim 1. If an independent claim is non-obvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). See MPEP §2143.03. Therefore the combination claimed in Claim 2 includes the following elements:

- an insert for use in a shell;
- top and bottom rings joined by circumferentially spaced apart ribs forming side openings;
- the ribs supporting flanges which thin inwardly and upwardly;
- a reinforcing member connected with the flanges at their upper inner ends to form a semi-spherical stop located beneath the upper edge of the top ring;
- the reinforcing member and flanges protruding above the top ring;
- the bottom surfaces of the flanges and the reinforcing member combining to form a semi-spherical stop;
- the ribs being inclined to form helically configured side openings;
- the flanges being helically directed.

This claimed combination is not disclosed by the combined teachings of the three references, even by using Applicants' claim as a hindsight blueprint and selecting elements as needed from the references (which is of course improper).

For the foregoing reasons, the Examiner is requested to withdraw the rejections of Claims 1-3 and allow the claims as amended.

#### New Independent Claim 4

In new Claim 4, Applicants have omitted the element of thinning the flanges. However the claim is directed to a novel combination relative to the cited prior art as a whole, in that it recites:

- an insert;
- top and bottom rings;



- inclined ribs;
- helically directed flanges;
- a reinforcing member;
- protrusion above the top ring;
- the flanges and the base of the reinforcing member combining to form a semi-spherical stop.

New Claim 5 further adds the thinning element. In addition, dependent Claims 6-10 have been added to further claim the invention.

### Secondary Considerations of Non-Obviousness

Secondary considerations become of utmost importance when considering technical information. "Courts, made up of laymen as they must be, are likely to either underrate, or to overrate the difficulties in making new and profitable discoveries in fields with which they cannot be familiar; and, so far as it is available, they had best appraise the originality involved by the circumstance which preceded, attended and succeeded the appearance of the invention. Safety Car Heating and Lighting Co. v. General Elec. Co., 69 USPQ 401 (2d Cir. 1946) (L. Hand). The originality of Applicants' claimed invention should be considered in view of the circumstances which preceded, attended and succeeded the appearance of his invention. The objective indicia of non-obviousness (the "secondary considerations" of *Graham*) are usually the most important items of evidence available and are properly viewed as a "fourth" factual inquiry in the *Graham v. Deere* investigation. Simmons Fastener Corp. v. Illinois Tool Works, Inc., 222 USPQ 744 (Fed. Cir. 1984), *cert denied*, 471 US 1065 (1985). See also Applied Materials, Inc. v. Advanced Semiconductor Materials America, Inc., 98 F.3d 1563, 1570, 40 USPQ2d 1481, 1486 (Fed. Cir. 1996) ("The objective evidence of unobviousness is not evaluated for its 'separate knockdown ability' against the 'stonewall' of the *prima facie* case. . . . but is considered together with all other evidence, in determining whether the invention as a whole would have been obvious to a person of ordinary skill in the field of the invention."). "Secondary considerations may be the most pertinent, probative and revealing evidence available to the decision making in reaching a

conclusion on the obviousness/non-obviousness issue ... ." Ashland Oil, Inc. v. Delta Resins and Refractories, Inc., 227 USPQ 657 (Fed. Cir. 1985). See also Simmons Fastener Corp. v. Illinois Tool Works, Inc., 739 F.2d 1573, 1576, 222 USPQ 744, 747 (Fed. Cir. 1984), *cert. denied*, 471 U.S. 1065 (1985) ("the evidence of secondary considerations in this case, particularly commercial success, is extremely strong, and is entitled to great weight.").

The marketplace response to a patented invention often provides a significant indication of the non-obviousness of an invention. See Graham v. John Deere Co., 383 US 1, 148 USPQ 459 (Supreme Ct. 1996). In such cases, "secondary considerations" supply objective evidence of how a patent is viewed by those directly interested in a patented product. Demaco Corp. v. F. Von Langsdorff Licensing, Ltd., 7 USPQ2d 1222 (Fed. Cir. 1988) *cert. denied*, 109 Supreme Ct. 395 (1988). These secondary considerations, which include commercial success, long-felt need for the invention, failure of others, and acquiescence of the industry, are in an essential and integral part of the determining obviousness. Alco Standard Corp. v. Tennessee Valley Auth., 1 USPQ2d 1337 (Fed. Cir. 1986).

The Court of Appeals for the Federal Circuit has opined that evidence of secondary considerations must be considered, when present, in determining obviousness. Ruiz v. A.B. Chance Co., 234 F.3d 654, 667, 57 USPQ2d 1161, 1169, (Fed. Cir. 2000). The Federal Circuit has further stated that "secondary considerations" should always be considered - even at the examination stage.

In an appeal of a rejection of a patent application, secondary considerations, such as commercial success, typically do not play a large part in the analysis of obviousness because the inventor usually waits until his patent issues before he swings production into full gear. Thus, a detailed analysis of secondary considerations is more common in cases like *John Deere*, which involved infringement. If, however, a patent application properly presents evidence relating to these secondary considerations, the board must always consider such evidence in connection with the determination of obviousness.

In re Sernaker, 702 F.2d 989, 996, 217 USPQ 1, 7 (Fed. Cir. 1983). In 1983, the Court of Appeals for the Federal Circuit also opined in *Stratoflex* that:

It is jurisprudentially inappropriate to disregard any relevant evidence on any issue in any case, patent cases included. Thus evidence rising out of the so-called "secondary considerations" must always when present be considered en route to a determination of obviousness . . . . Indeed, evidence of secondary considerations may often be the most probative and cogent evidence in the record. It may often establish that an invention appearing to have been obvious in light of the prior art was not. It is to be considered as part of all the evidence, not just when the decision maker remains in doubt after reviewing the art. Stratoflex, 713 F.2d at 1538, 218 USPQ at 879.

Once the Applicant shows significant sales of the patented product, the burden of rebuttal is on the Examiner to show that the commercial success was due to extraneous factors other than the merit of the patented invention. Demaco at 1392-93. The evidence submitted herewith of commercial success, together with the technical arguments provided herein, establishes the non-obviousness of the claimed invention.

A failure of others to do that which the patent claims is strong evidence of non-obviousness. See Indian Head Industries, Inc. v. Ted Smith Equipment Co., Inc., 859 F. Supp. 1095, 1103, 36 USPQ2d 1316, 1322 (E.D. Mich. 1994) (citing Treatise; "The idea is that if the industry felt a need, yet failed to produce the innovation for a significant period of time, then the innovation must not have been obvious to those with ordinary skills in the art."). In the matter present application, the Hahn reference has been in the public domain since 1903. Others skilled in this crowded art have apparently not, since 1903, conceived modifying Hahn in the way that the Examiner contends was obvious. Accordingly, the Applicants respectfully assert that this is further evidence of the non-obviousness of the present invention.

Commercial success is considered relevant to lack of obviousness on the rationale that competitors would have been economically motivated to make the

invention sooner if it had been truly obvious. Minnesota Mining and Mfg. Co. v. Research Medical, Inc., 6 USPQ2d 1401 (D. Utah 1987). The theory behind commercial acquiescence is that persons would not normally act in a fashion contrary to their economic interest unless convinced of the patent's validity. Chisum Patents, Section 5.05[3]. When a patentee can demonstrate commercial success, usually shown by significant sales in a relevant market, and that the successful product is the invention disclosed and claimed in the patent, it is presumed that the commercial success is due to the patented invention. Demaco Corp. v. F. Von Langsdorff Licensing Ltd., 851 F.2d 1387, 1392-93, 7 USPQ2d 1222, 1226-27 (Fed. Cir. 1988). In the present case, an Affidavit (see Attachment A) is provided by one of the inventors, wherein, among other things, commercial success is described. The Applicants respectfully assert that this is further evidence of the non-obviousness of the present invention.

#### Conclusion

Applicants have devised a novel and useful part for the valve of a downhole reciprocating rod pump. This part is an 'insert', as that term is understood in the downhole pump art. It is used as a replaceable component in a shell. The insert utilizes a plurality of arched flanges to help form a semi-spherical stop that centers the ball at the top of its travel. The stop is positioned beneath the upper edge of the top ring. The flanges are preferably thinned at their inner ends. The relatively fragile flanges are strengthened by joining them to a central elongate reinforcing member that is accommodated by extending it above the top ring. The reinforcing member combines with the flanges to form the stop. The ribs, windows and flanges are constructed helically to induce helical flow that improves the fluid throughput. These elements are combined as defined in Claims 1 –10.

Based upon the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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